Menthol	2	parts
Alcohol	5	parts

Attar of rose or other perfume, quantity sufficient.

Rose water sufficient to make a paste.

Beat the soap with a little rose water, then warm until softened, add syrup and tincture of carmine. Dissolve the perfume and menthol in the alcohol and add to soap mixture. Add the solids and incorporate thoroughly. Finally, work to a proper consistency for filling into collapsible tubes, adding water, if necessary.

MOUTH WASHES.

I.—Quillaia bark	125	parts
Glycerine	95	parts
Alcohol	155	parts

Macerate for 4 days and add:

Acid. carbol. cryst	4	parts
Ol. geranii	0.6	parts
Ol. caryophyll	0.6	parts
Ol. rosæ	0.6	parts
Ol. cinnam	0.6	parts
Tinct. ratanhæ	45	parts
Aqua rosæ	900	parts

Macerate again for 4 days and filter.

Thymol	20	parts
Peppermint oil	10	parts
Clove oil	5	parts
Sage oil	5	parts
Marjoram oil	3	parts
Sassafras oil	3	parts
Wintergreen oil	0.5	parts
Coumarin	0.5	parts
Alcohol, dil	1,000	parts

A teaspoonful in a glass of water.

II.—Tincture orris (1 in 4)	1½	parts
Lavender water	½	part
Tinct. cinnamon (1 in 8)	1	part
Tinct. yellow cinch bark	1	part
Eau de cologne	2	parts

Orris and Rose.—

III.—Orris root	30	drachms
Rose leaves	8	drachms
Soap bark	8	drachms
Cochineal	3½	drachms
Diluted alcohol	475	drachms
Oil rose	30	drops
Oil neroli	40	drops

Myrrh Astringent.—

IV.—Tincture myrrh	125	drachms
Tincture benzoin	50	drachms
Tincture cinchona	8	drachms
Alcohol	225	drachms
Oil of rose	30	drops

Borotonic.—

V.—Acid boric	20	parts
Oil wintergreen	10	parts
Glycerine	110	parts
Alcohol	150	parts
Distilled water enough to make	600	parts

Sweet Salicyl.—

VI.—Acid salicylic	4	parts
Saccharine	1	part
Sodium bicarbonate	1	part
Alcohol	200	parts

Foaming Orange.—

VII.—Castile soap	29	drachms
Oil orange	10	drops
Oil cinnamon	5	drops
Distilled water	30	drachms
Alcohol	90	drachms

Australian Mint.—

VIII.—Thymol	0.25	parts
Acid benzoic	3	parts
Tincture eucalyptus	15	parts
Alcohol	100	parts
Oil peppermint	0.75	parts

Fragrant Dentine.—

IX.—Soap bark	125	parts
Glycerine	95	parts
Alcohol	155	parts
Rose water	450	parts

Macerate for 4 days and add:

Carbolic acid, cryst	4	parts
Oil geranium	0.6	parts
Oil cloves	0.6	parts
Oil rose	0.6	parts
Oil cinnamon	0.6	parts
Tincture rhatany	45	parts
Rose water	450	parts

Allow to stand 4 days; then filter.

Aromantiseptic.—

X.—Thymol	20	parts
Oil peppermint	10	parts
Oil cloves	5	parts
Oil sage	5	parts
Oil marjoram	3	parts
Oil sassafras	3	parts
Oil wintergreen	0.5	parts
Coumarin	0.5	parts
Diluted alcohol	1,000	parts

The products of the foregoing formulas are used in the proportion of 1 teaspoonful in a half glassful of water.

Foaming.—

XI.—Soap bark, powder	2	ounces
Cochineal powder	60	grains
Glycerine	3	ounces

Alcohol..........	10 ounces
Water sufficient to make.......	32 ounces

Mix the soap, cochineal, glycerine, alcohol, and water together; let macerate for several days; filter and flavor; if same produces turbidity, shake up the mixture with magnesium carbonate, and filter through paper.

Odonter.—

XII.—Soap bark, powder	2 ounces
Cudbear, powder.	4 drachms
Glycerine.......	4 ounces
Alcohol.........	14 ounces
Water sufficient to make......	32 ounces

Mix, and let macerate with frequent agitation, for several days; filter; add flavor; if necessary filter again through magnesium carbonate or paper pulp.

Sweet Anise.—

XIII.—Soap bark........	2 ounces
Aniseed..........	4 drachms
Cloves...........	4 drachms
Cinnamon.......	4 drachms
Cochineal.......	60 grains
Vanilla..........	60 grains
Oil of peppermint.	1 drachm
Alcohol..........	16 ounces
Water sufficient to make.........	32 ounces

Reduce the drugs to coarse powder, dissolve the oil of peppermint in the alcohol, add equal parts of water, and macerate therein the powders for 5 to 6 days, with frequent agitation; place in percolator and percolate until 32 fluidounces have been obtained. Let stand for a week and filter through paper; if necessary to make it perfectly bright and clear, shake up with some magnesia, and again filter.

Saponaceous.—

XIV.—White castile soap	2 ounces
Glycerine........	2 ounces
Alcohol..........	8 ounces
Water...........	4 ounces
Oil peppermint...	20 drops
Oil wintergreen...	30 drops
Solution of carmine N. F. sufficient to color.	

Dissolve the soap in the alcohol and water, add the other ingredients, and filter.

XV.—Crystallized carbolic acid......	4 parts
Eucalyptol.......	1 part
Salol...........	2 parts
Menthol.........	0.25 parts
Thymol..........	0.1 part
Alcohol.........100	parts

Dye with cochineal ($1\frac{1}{2}$ per cent).

Jackson's Mouth Wash.—Fresh lemon peel, 10 parts; fresh sweet orange peel, 10 parts; angelica root, 10 parts; guaiacum wood, 30 parts; balsam of Tolu, 12 parts; benzoin, 12 parts; Peruvian balsam, 4 parts; myrrh, 3 parts; alcohol (90 per cent), 500 parts.

Tablets for Antiseptic Mouth Wash.—Heliotropine, 0.01 part; saccharine, 0.01 part; salicylic acid, 0.01 part; menthol, 1 part; milk sugar, 5 parts. These tablets may be dyed green, red, or blue, with chlorophyll, eosine, and indigo carmine, respectively.

Depilatories

Depilatory Cream.—The depilatory cream largely used in New York hospitals for the removal of hair from the skin previous to operations:

I.—Barium sulphide....	3 parts
Starch.............	1 part
Water, sufficient quantity.	

The mixed powders are to be made into a paste with water, and applied in a moderately thick layer to the parts to be denuded of hair, the excess of the latter having been previously trimmed off with a pair of scissors. From time to time a small part of the surface should be examined, and when it is seen that the hair can be removed, the mass should be washed off. The barium sulphide should be quite fresh. It can be prepared by making barium sulphate and its own weight of charcoal into a paste with linseed oil, rolling the paste into the shape of a sausage, and placing it upon a bright fire to incinerate. When it has ceased to burn, and is a white hot mass, remove from the fire, cool, and powder.

The formula is given with some reserve, for preparations of this kind are usually unsafe unless used with great care. It should be removed promptly when the skin begins to burn.

II.—Barium sulphide....	25 parts
Soap.............	5 parts
Talc.............	35 parts
Starch...........	35 parts
Benzaldehyde sufficient to make...	120 parts

Powder the solids and mix. To use, to a part of this mixture add 3 parts of water, at the time of its application, and with a camel's-hair pencil paint the mixture evenly over the spot to be freed of hair. Let remain in contact with the

skin for 5 minutes, then wash off with a sponge, and in the course of 5 minutes longer the hair will come off on slight friction with the sponge.

Strontium sulphide is an efficient depilatory. A convenient form of applying it is as follows:

III.—	Strontium sulphide .	2 parts
	Zinc oxide.	3 parts
	Powdered starch . . .	3 parts

Mix well and keep in the dry state until wanted for use, taking then a sufficient quantity, forming into a paste with warm water and applying to the surface to be deprived of hair. Allow to remain from 1 to 5 minutes, according to the nature of the hair and skin; it is not advisable to continue the application longer than the last named period. Remove in all cases at once when any caustic action is felt. After the removal of the paste, scrape the skin gently but firmly with a blunt-edged blade (a paper knife, for instance) until the loosened hair is removed. Then immediately wash the denuded surface well with warm water, and apply cold cream or some similar emollient as a dressing.

		By weight
IV.—	Alcohol.	12 parts
	Collodion	35 parts
	Iodine	0.75 parts
	Essence of turpentine	1.5 parts
	Castor oil.	2 parts

Apply with a brush on the affected parts for 3 or 4 days in thick coats. When the collodion plaster thus formed is pulled off, the hairs adhere to its inner surface.

V.—Rosin sticks are intended for the removal of hairs and are made from colophony with an admixture of 10 per cent of yellow wax. The sticks are heated like a stick of sealing wax until soft or semi-liquid (142° F.), and lightly applied on the place from which the hair is to be removed, and the mass is allowed to cool. These rosin sticks are said to give good satisfaction.

DEPRESSION GARDEN (Chemical Flowers):

Put several pieces of soft porous coal in a dish or bowl then mix

- 6 tablespoonfuls of salt
- 6 tablespoonfuls of blueing
- 6 tablespoonfuls of water
- 1 tablespoonful of ammonia water

and pour this over the pieces of coal. After the coal has been wet with the mixture above, drop on a few drops of mercurochrome solution or a few drops of green or red ink or any vegetable dye, which is used for coloring desserts, etc.

Shortly after the materials have been brought together, a coral like colored growth soon begins to appear on the pieces of coal, and this growth increases as the days go by.

To prevent the growth forming on the edges of the bowl or dish, rub on a little vaseline and the growth will not extend beyond the vaseline. Ammonia water can be added to the dish every little while to produce more growth, of snow crystals.

"The Depression Garden" looks like tiny islands in a lake, covered with verdure and snow. A few twigs of evergreen can be stuck on the lumps of coal, they will look like tiny trees and the effect is improved.

DIAMOND TESTS:

See also Gems and Jewelers' Formulas.

To Distinguish Genuine Diamonds.—If characters or marks of any kind are drawn with an aluminum pencil on glass, porcelain, or any substance containing silex, the marks cannot be erased by rubbing, however energetic the friction, and even acids will not cause them to disappear entirely, unless the surface is entirely freed from greasy matter, which can be accomplished by rubbing with whiting and passing a moistened cloth over the surface at the time of writing. So, in order to distinguish the true diamond from the false, it is necessary only to wipe the stone carefully and trace a line on it with an aluminum pencil, and then rub it briskly with a moistened cloth. If the line continues visible, the stone is surely false. If, on the contrary, the stone is a true diamond, the line will disappear without leaving a trace, and without injury to the stone.

The common test for recognizing the diamond is the file, which does not cut it, though it readily attacks imitations. There are other stones not affected by the file, but they have characteristics of color and other effects by which they are readily distinguished.

This test should be confirmed by others. From the following the reader can select the most convenient:

A piece of glass on which the edge of a diamond is drawn, will be cut without much pressure; a slight blow is sufficient to separate the glass. An imitation may scratch the glass, but this will not be cut as with the diamond.

If a small drop of water is placed upon the face of a diamond and moved about by means of the point of a pin, it will preserve its globular form, provided the stone is clean and dry. If the attempt is made on glass, the drop will spread.

A diamond immersed in a glass of water will be distinctly visible, and will shine clearly through the liquid. The imitation stone will be confounded with the water and will be nearly invisible.

By looking through a diamond with a glass at a black point on a sheet of white paper, a single distinct point will be seen. Several points, or a foggy point will appear if the stone is spurious.

Hydrofluoric acid dissolves all imitations, but has no effect on true diamonds. This acid is kept in gutta-percha bottles.

For an eye practiced in comparisons it is not difficult to discern that the facets in the cut of a true diamond are not as regular as are those of the imitation; for in cutting and polishing the real stone an effort is made to preserve the original as much as possible, preferring some slight irregularities in the planes and edges to the loss in the weight, for we all know that diamonds are sold by weight. In an imitation, however, whether of paste or another less valuable stone, there is always an abundance of cheap material which may be cut away and thereby form a perfect-appearing stone.

Take a piece of a fabric, striped red and white, and draw the stone to be tested over the colors. If it is an imitation, the colors will be seen through it, while a diamond will not allow them to be seen.

A genuine diamond, rubbed on wood or metal, after having been previously exposed to the light of the electric arc, becomes phosphorescent in darkness, which does not occur with imitations.

Heat the stone to be tested, after giving it a coating of borax, and let it fall into cold water. A diamond will undergo the test without the slightest damage; the glass will be broken in pieces.

Finally, try with the fingers to crush an imitation and a genuine diamond between two coins, and you will soon see the difference.

DIAMOND CEMENT:

See Adhesives, under Jewelers' Cements.

DIARRHEA IN BIRDS:

See Veterinary Formulas.

DIARRHEA REMEDIES:

See Cholera Remedies.

Die Venting.—Many pressmen have spent hours and days in the endeavor to produce sharp and full impressions on figured patterns. If all the deep recesses in deep-figured dies are vented to allow the air to escape when the blow is struck, it will do much to obtain perfect impressions, and requires only half the force that is necessary in unvented dies. This is not known in many shops and consequently this little air costs much in power and worry.

DIGESTIVE POWDERS AND TABLETS.

I.—	Sodium bicarbonate	93 parts
	Sodium chlorate	4 parts
	Calcium carbonate	3 parts
	Pepsin	5 parts
	Ammonium carbonate	1 part
II.—	Sodium bicarbonate	120 parts
	Sodium chlorate	5 parts
	Sal physiologic (see below)	4 parts
	Magnesium carbonate	10 parts
III.—	Pepsin, saccharated (U. S. P.)	10 drachms
	Pancreatin	10 drachms
	Diastase	50 drachms
	Acid, lactic	40 drops
	Sugar of milk	40 drachms
IV.—	Pancreatin	3 parts
	Sodium bicarbonate	15 parts
	Milk sugar	2 parts

Sal Physiologicum.—The formula for this ingredient, the so-called nutritive salt (*Nahrsalz*), is as follows:

Calcium phosphate	40 parts
Potassium sulphate	2 parts
Sodium phosphate	20 parts
Sulphuric, precipitated	5 parts
Sodium chlorate	60 parts
Magnesium phosphate	5 parts
Carlsbad salts, artificial	60 parts
Silicic acid	10 parts
Calcium fluoride	2½ parts

Digestive Tablets.—

Powdered double refined sugar	300 parts
Subnitrate bismuth	60 parts
Saccharated pepsin	45 parts
Pancreatin	45 parts
Mucilage	35 parts
Ginger	30 parts

Mix and divide into suitable sizes.

DIOGEN DEVELOPER:
See Photography.

DIP FOR BRASS:
See Plating and Brass.

DIPS:
See Metals.

DIPS FOR CATTLE:
See Disinfectants and Veterinary Formulas.

DISH WASHING:
See Household Formulas

Disinfectants

Disinfecting Fluids.—

I.—Creosote	40 gallons
Rosin, powdered	56 pounds
Caustic soda lye, 38° Tw	9 gallons
Boiling water	12 gallons
Methylated spirit	1 gallon
Black treacle	14 pounds

Melt the rosin and add the creosote; run in the lyes; then add the matter and methylated spirit mixed together, and add the treacle; boil all till dissolved and mix well together.

II.—Hot water	120 pounds
Caustic soda lye, 38° B	120 pounds
Rosin	300 pounds
Creosote	450 pounds

Boil together the water, lye, and rosin, till dissolved; turn off steam and stir in the creosote; keep on steam to nearly boiling all the time, but so as not to boil over, until thoroughly incorporated.

III.—Fresh-made soap (hard yellow)	7 pounds
Gas tar	21 pounds
Water, with 2 pounds soda	21 pounds

Dissolve soap (cut in fine shavings) in the gas tar; then add slowly the soda and water which has been dissolved.

IV.—Rosin	1 cwt.
Caustic soda lye, 18° B	16 gallons
Black tar oil	½ gallon
Nitro-naphthalene dissolved in boiling water (about ½ gallon)	2 pounds

Melt the rosin, add the caustic lye; then stir in the tar oil and add the nitro-naphthalene.

V.—Camphor	1 ounce
Carbolic acid (75 per cent)	12 ounces
Aqua ammonia	10 drachms
Soft salt water	8 drachms

To be diluted when required for use.

VI.—Heavy tar oil	10 gallons
Caustic soda dissolved in 5 gallons water 600° F.	30 pounds

Mix the soda lyes with the oil, and heat the mixture gently with constant stirring; add, when just on the boil, 20 pounds of refuse fat or tallow and 20 pounds of soft soap; continue the heat until thoroughly saponified, and add water gradually to make up 40 gallons. Let it settle; then decant the clear liquid.

Disinfecting Fluids or Weed-Killers.— I.—Cold water, 20 gallons; powdered rosin, 56 pounds; creosote oil, 40 gallons; sulphuric acid, ¼ gallon; caustic soda lye, 30° B., 9 gallons.

Heat water and dissolve the rosin; then add creosote and boil to a brown mass and shut off steam; next run in sulphuric acid and then the lyes.

II.—Water	40 gallons
Powdered black rosin	56 pounds
Sulphuric acid	2½ gallons
Creosote	10 gallons
Melted pitch	24 pounds
Pearlash boiled in 10 gallons water	56 pounds

Boil water and dissolve rosin and acid; then add creosote and boil well again; add pitch and run in pearlash solution (boiling); then shut off steam.

III. (White).—Water, 40 gallons; turpentine, 2 gallons; ammonia, ½ gallon; carbolic crystals, 14 pounds; caustic lyes, 2 gallons; white sugar, 60 pounds, dissolved in 40 pounds water.

Heat water to boiling, and add first turpentine, next ammonia, and then carbolic crystals. Stir well until thoroughly dissolved, and add lyes and sugar solution.

DISINFECTING POWDERS.

I.—Sulphate of iron	100 parts
Sulphate of zinc	50 parts
Oak bark, powder	40 parts
Tar	5 parts
Oil	5 parts

II.—Mix together chloride of lime and burnt umber, add water, and set on plates.

Blue Sanitary Powder.—

Powdered alum	2	pounds
Oil of eucalyptus	12	ounces
Rectified spirits of tar	6	ounces
Rectified spirit of turpentine	2	ounces
Ultramarine blue (common)	¾	ounces
Common salt	14	pounds

Mix alum with about 3 pounds of salt in a large mortar, gradually add oil of eucalyptus and spirits, then put in the ultramarine blue, and lastly remaining salt, mixing all well, and passing through a sieve.

Carbolic Powder. (Strong).—Slaked lime in fine powder, 1 cwt.; carbolic acid, 75 per cent, 2 gallons.

Color with aniline dye and then pass through a moderately fine sieve and put into tins or casks and keep air-tight.

Pink Carbolized Sanitary Powder.—

Powdered alum	6	ounces
Powdered green copperas	5	pounds
Powdered red lead	5	pounds
Calvert's No. 5 carbolic acid	12½	pounds
Spirit of turpentine	1½	pounds
Calais sand	10	pounds
Slaked lime	60	pounds

Mix carbolic acid with turpentine and sand, then add the other ingredients, lastly the slaked lime and, after mixing, pass through a sieve. It is advisable to use lime that has been slaked some time.

DISINFECTANT SOLUTIONS FOR HOUSEHOLD USE:

Camphor Gum	4 ounces
Alcohol	10 ounces fl.
Water	10 ounces fl.
Calcium hypochlorite	10 ounces
Oil cloves	2 drams
Eucalyptol	2 drams

Cut up the camphor and dissolve in the alcohol, then add the eucalyptol and oil cloves. This solution should be cold. Now dissolve in it the calcium hypochlorite.

A few drops of this fluid on a piece of cloth and hung in the room is enough.

Deodorants for Water-Closets.—

I.—

Ferric chloride	4 parts
Zinc chloride	5 parts
Aluminum chloride	5 parts
Calcium chloride	4 parts
Magnesium chloride	3 parts
Water sufficient to make	90 parts

Dissolve, and add to each gallon 10 grains thymol and ¼ ounce oil of rosemary, previously dissolved in about 6 quarts of alcohol, and filter.

II.—

Sulphuric acid, fuming	90 parts
Potassium permanganate	45 parts
Water	4,200 parts

Dissolve the permanganate in the water, and add under the acid. This is said to be a most powerful disinfectant, deodorizer, and germicide. It should not be used where there are metal trimmings.

Formaldehyde for Disinfecting Books, Papers, etc.—The property of formaldehyde of penetrating all kinds of paper, even when folded together in several layers, may be utilized for a perfect disinfection of books and letters, especially at a temperature of 86° to 122° F. in a closed room. The degree of penetration as well as the disinfecting power of the formaldehyde depend upon the method of generating the gas. Letters, paper in closed envelopes, are completely disinfected only in 12 hours, books in 24 hours at a temperature of 122° F. when 70 cubic centimeters of formochloral—17.5 g. of gas—per cubic meter of space are used. Books must be stood up in such a manner that the gas can enter from the sides. Bacilli of typhoid preserve their vitality longer upon unsized paper and on filtering paper than on other varieties.

There is much difference of opinion as to the disinfecting and deodorizing power of formaldehyde when used to disinfect wooden tierces. While some have found it to answer well, others have got variable results, or failed of success. The explanation seems to be that those who have obtained poor results have not allowed time for the disinfectant to penetrate the pores of the wood, the method of application being wrong. The solution is thrown into the tierce, which is then steamed out at once, whereby the aldehyde is volatilized before it has had time to do its work. If the formal and the steam, instead of being used in succession, were used together, the steam would carry the disinfectant into the pores of the wood. But a still better plan is to give the aldehyde more time.

Another point to be remembered in all cases of disinfection by formaldehyde is that a mechanical cleansing must precede the action of the antiseptic. If there are thick deposits of organic matter which can be easily dislodged with a scrubbing brush, they can only be disinfected by the use of large quantities of formaldehyde used during a long period of time.

General Disinfectants.—

I.—Alum	10 ounces
Sodium carbonate	10 ounces
Ammonium chloride	2 ounces
Zinc chloride	1 ounce
Sodium chloride	2 ounces
Hydrochloric acid, quantity sufficient.	
Water to make 1 gallon.	

Dissolve the alum in one half gallon of boiling water, and add the sodium carbonate; then add hydrochloric acid until the precipitate formed is dissolved. Dissolve the other salt in water and add to the previous solution. Finally add enough water to make the whole measure 1 gallon, and filter.

In use, this is diluted with 7 parts of water.

II.—For the Sick Room.—In using this ventilate frequently: Guaiac, 10 parts; eucalyptol, 8 parts; phenol, 6 parts; menthol, 4 parts; thymol, 2 parts; oil of cloves, 1 part; alcohol of 90 per cent, 170 parts.

Atomizer Liquid for Sick Rooms.—

III.—Eucalyptol	10	Parts by weight.
Thyme oil	5	
Lemon oil	5	
Lavender oil	5	
Spirit, 90 per cent	110	

To a pint of water a teaspoonful for evaporation.

Non-Poisonous Sheep Dips.—Paste.—

I.—Creosote (containing 15 per cent to 20 per cent of carbolic acid)	2 parts
Stearine or Yorkshire grease	1 part
Caustic soda lyes, specific gravity, 1340	1 part
Black rosin, 5 per cent to 10 per cent.	

Melt the rosin and add grease and soda lyes, and then add creosote cold.

II.—Creosote	1 part
Crude hard rosin oil	1 part

Put rosin oil in copper and heat to about 220° F., and add as much caustic soda powder, 98 per cent strength, as the oil will take up. The quantity depends upon the amount of acetic acid in the oil. If too much soda is added it will remain at the bottom. When the rosin oil has taken up the soda add creosote, and let it stand.

Odorless Disinfectants.—

I.—Ferric chloride	4 parts
Zinc chloride	5 parts
Aluminum chloride	5 parts
Calcium chloride	4 parts
Manganese chloride	3 parts
Water	69 parts

If desired, 10 grains thymol and 2 fluidrachms oil of rosemary, previously dissolved in about 12 fluidrachms of alcohol, may be added to each gallon.

II.—Alum	10 parts
Sodium carbonate	10 parts
Ammonium chloride	2 parts
Sodium chloride	2 parts
Zinc chloride	1 part
Hydrochloric acid, sufficient.	
Water	100 parts

Dissolve the alum in about 50 parts boiling water and add the sodium carbonate. The resulting precipitate of aluminum hydrate dissolve with the aid of just sufficient hydrochloric acid, and add the other ingredients previously dissolved in the remainder of the water.

III.—Mercuric chloride	1 part
Cupric sulphate	10 parts
Zinc sulphate	50 parts
Sodium chloride	65 parts
Water to make 1,000 parts.	

Paris Salts.—The disinfectant known by this name is a mixture made from the following recipe:

Zinc sulphate	49 parts
Ammonia alum	49 parts
Potash permanganate	1 part
Lime	1 part

The ingredients are fused together, mixed with a little calcium chloride, and perfumed with thymol.

Platt's Chlorides.—

I.—Aluminum sulphate	6 ounces
Zinc chloride	1½ ounces
Sodium chloride	2 ounces
Calcium chloride	3 ounces
Water enough to make 2 pints.	

II.—A more elaborate formula for a preparation said to resemble the proprietary article is as follows:

Zinc, in strips	4	ounces
Lead carbonate	2	ounces
Chlorinated lime	1	ounce
Magnesium carbonate	½	ounce
Aluminum hydrate	1½	ounces
Potassium hydrate	½	ounce
Hydrochloric acid	16	ounces
Water	16	ounces
Whiting, enough.		

Dissolve the zinc in the acid; then add the other salts singly in the order named, letting each dissolve before the next is added. When all are dissolved add the water to the solution, and after a couple of hours add a little whiting to neutralize any excess of acid; then filter.

Zinc chloride ranks very low among disinfectants, and the use of such solutions as these, by giving a false sense of security from disease germs, may be the means of spreading rather than of checking the spread of sickness.

Disinfecting Coating.—Carbolic acid, 2 parts; manganese, 3 parts; calcium chloride, 2 parts; china clay, 10 parts; infusorial earth, 4 parts; dextrin, 2 parts; and water, 10 parts.

DISTEMPER IN CATTLE:
See Veterinary Formulas.

DOG "NUISANCE":

A solution made by dissolving 1½ teaspoonfuls of "black leaf 40" in a gallon of water and sprayed on bushes and trees is a simple method of preventing dogs from detroying small evergreens and shrubs.

DOG BISCUIT.

The waste portions of meat and tallow, including the skin and fiber, have for years been imported from South American tallow factories in the form of blocks. Most of the dog bread consists principally of these remnants, chopped and mixed with flour. They contain a good deal of firm fibrous tissue, and a large percentage of fat, but are lacking in nutritive salts, which must be added to make good dog bread, just as in the case of the meat flour made from the waste of meat extract factories. The flesh of dead animals is not used by any reputable manufacturers, for the reason that it gives a dark color to the dough, has an unpleasant odor, and if not properly sterilized would be injurious to dogs as a steady diet.

Wheat flour, containing as little bran as possible, is generally used, oats, rye, or Indian meal being only mixed in to make special varieties, or, as in the case of Indian meal, for cheapness. Rye flour would give a good flavor, but it dries slowly, and the biscuits would have to go through a special process of drying after baking, else they would mold and spoil. Dog bread must be made from good wheat flour, of a medium sort, mixed with 15 or 16 per cent of sweet, dry chopped meat, well baked and dried like pilot bread or crackers. This is the rule for all the standard dog bread on the market. There are admixtures which affect more or less its nutritive value, such as salt, vegetables, chopped bones, or bone meal, phosphate of lime, and other nutritive salts. In preparing the dough and in baking, care must be taken to keep it light and porous.

DOG DISEASES AND THEIR REMEDIES:
See Veterinary Formulas.

DOG SOAP:
See Soap.

DONARITE:
See Explosives.

DOORS, TO CLEAN:
See Cleaning Preparations and Methods.

DOSES FOR ADULTS AND CHILDREN.

The usual method pursued by medical men in calculating the doses of medicine for children is to average the dose in proportion to their approximate weight or to figure out a dose upon the assumption that at 12 years of age half of an adult dose will be about right. Calculated on this basis the doses for those under 12 will be in direct proportion to the age in years plus 12, divided into the age. By this rule a child 1 year old should get 1 plus 12, or 13, dividing 1, or $\frac{1}{13}$ of an adult dose. If the child is 2 years old it should get 2 plus 12, or 14, dividing 2, or $\frac{1}{7}$ of an adult dose. A child of 3 years should get 3 plus 12, or 15, dividing 3, or $\frac{1}{5}$ of an adult dose. A child of 4 should get 4 plus 12, or 16, dividing 4, or $\frac{1}{4}$ of an adult dose.

As both children and adults vary materially in size when of the same age the calculation by approximate weights is the more accurate way. Taking the weight of the average adult as 150 pounds, then a boy, man, or woman, whatever the age, weighing only 75 pounds should receive only one-half of an adult dose, and a man of 300 pounds, provided his weight is the result of a properly proportioned body, and not due to mere adipose

tissue, should be double that of the average adult. If the weight is due to mere fat or to some diseased condition of the body, such a calculation would be entirely wrong. The object of the calculation is to get as nearly as possible to the amount of dilution the dose undergoes in the blood or in the intestinal contents of the patient. Each volume of blood should receive exactly the same dose in order to give the same results, other conditions being equal.

DOSE TABLE FOR VETERINARY PURPOSES:

See Veterinary Formulas.

DRAWINGS, PRESERVATION OF.

Working designs and sketches are easily soiled and rendered unsuitable for further use. This can be easily avoided by coating them with collodion, to which 24 per cent of stearine from a good stearine candle has been added. Lay the drawing on a glass plate or a board, and pour on the collodion, as the photographer treats his plates. After 10 or 20 minutes the design will be dry and perfectly white, possessing a dull luster, and being so well protected that it may be washed off with water without fear of spoiling it.

DOUCHE POWDER FOR WOMEN:

Lysol	12 drops
Menthol	12 grains
Boric acid	1 ounce
Powdered potassium permanganate	12 grains
Sodium bicarbonate, a quantity sufficient to make	6 ounces

Powder the menthol and mix all ingredients well together. Use two ounces of above powder to a quart of water.

DUTCH CLEANER:

Infusorial earth
Soda ash

Equal parts of both, mixed together.

DUST LAYING POWDER:

Sawdust	36 ounces
Clay powder	18 ounces
Starch	4 ounces
Saturated solution of magnesium chloride	72 ounces

Mix, heat and grind to powder.

DUST PREVENTERS AND DUST CLOTHS:

See Household Formulas.

Dyes

In accordance with the requirements of dyers, many of the following recipes describe dyes for large quantities of goods, but to make them equally adapted for the use of private families they are usually given in even quantities, so that it is an easy matter to ascertain the quantity of materials required for dyeing, when once the weight of the goods is known, the quantity of materials used being reduced in proportion to the smaller quantity of goods.

Employ soft water for all dyeing purposes, if it can be procured, using 4 gallons water to 1 pound of goods; for larger quantities a little less water will do. Let all the implements used in dyeing be kept perfectly clean. Prepare the goods by scouring well with soap and water, washing out the soap well, and dipping in warm water, before immersion in the dye or mordant. Goods should be well aired, rinsed, and properly hung up after dyeing. Silks and fine goods should be tenderly handled, otherwise injury to the fabric will result.

Aniline Black.—Water, 20 to 30 parts; chlorate of potassa, 1 part; sal ammoniac, 1 part; chloride of copper, 1 part; aniline and hydrochloric acid, each 1 part, previously mixed together. It is essential that the preparation should be acid, and the more acid it is the more rapid will be the production of the blacks; if too much so, it may injure the fabric. The fabric or yarn is dried in ageing rooms at a low temperature for 24 hours, and washed afterwards.

Black on Cotton.—For 40 pounds goods, use sumac, 30 pounds; boil ¾ of an hour; let the goods steep overnight, and immerse them in limewater, 40 minutes, remove, and allow them to drip ¾ of an hour; add copperas, 4 pounds, to the sumac liquor, and dip 1 hour more; next work them through limewater for 20 minutes; then make a new dye of logwood, 20 pounds, boil 2½ hours, and enter the goods 3 hours; then add bichromate of potash, 1 pound, to the new dye, and dip 1 hour more. Work in clean cold water and dry out of the sun.

Black Straw Hat Varnish.—Best alcohol, 4 ounces; pulverized black sealing wax, 1 ounce. Place in a phial, and put the phial into a warm place, stirring or shaking occasionally until the wax is dissolved. Apply it when warm before the fire or in the sun. This makes a beautiful gloss.

Chrome Black for Wool. — For 40 pounds of goods, use blue vitriol, 3 pounds; boil a short time, then dip the wool or fabric ¾ of an hour, airing frequently. Take out the goods, and make a dye with logwood, 24 pounds; boil ½ hour, dip ¾ of an hour, air the goods, and dip ½ of an hour longer; then wash in strong soapsuds. A good fast color.

Black Dye on Wool, for Mixtures.—For 50 pounds of wool, take bichromate of potash, 1 pound, 4 ounces; ground argal, 15 ounces; boil together and put in the fabric, stirring well, and let it remain in the dye 5 hours. Take it out, rinse slightly in clean water, then make a new dye, into which put logwood, 1½ pounds. Boil 1¼ hours, adding chamber lye, 5 pints. Let the fabric remain in all night, and wash out in clean water.

Bismarck Brown.—Mix together 1 pound Bismarck, 5 gallons water, and ¼ pound sulphuric acid. This paste dissolves easily in hot water and may be used directly for dyeing. A liquid dye may be prepared by making the bulk of the above mixture to 2 gallons with alcohol. To dye, sour with sulphuric acid; add a quantity of sulphate of soda, immerse the wool, and add the color by small portions, keeping the temperature under 212° F. Very interesting shades may be developed by combining the color with indigo paste or picric acid.

Chestnut Brown for Straw Bonnets.—For 25 hats, use ground sanders, 1½ pounds; ground curcuma, 2 pounds; powdered gallnuts or sumac, ¾ pound; rasped logwood, $\frac{1}{10}$ pound. Boil together with the hats in a large kettle (so as not to crowd), for 2 hours, then withdraw the hats, rinse, and let them remain overnight in a bath of nitrate of 4° Bé., when they are washed. A darker brown may be obtained by increasing the quantity of sanders. To give the hats the desired luster, they are brushed with a brush of couchgrass, when dry.

Cinnamon or Brown for Cotton and Silk.—Give the goods as much color, from a solution of blue vitriol, 2 ounces, to water, 1 gallon, as they will take up in dipping 15 minutes; then turn them through limewater. This will make a beautiful sky blue of much durability. The fabric should next be run through a solution of prussiate of potash, 1 ounce, to water, 1 gallon.

Brown Dye for Cotton or Linen.—Give the pieces a mixed mordant of acetate of alumina and acetate of iron, and then dye them in a bath of madder, or madder and fustic. When the acetate of alumina predominates, the dye has an amaranth tint. A cinnamon tint is obtained by first giving a mordant of alum, next a madder bath, then a bath of fustic, to which a little green copperas has been added.

Brown for Silk.—Dissolve annatto, 1 pound; pearlash, 4 pounds, in boiling water, and pass the silk through it for 2 hours; then take it out, squeeze well, and dry. Next give it a mordant of alum, and pass through a bath of brazil wood, and afterwards through a bath of logwood, to which a little green copperas has been added; wring it out and dry; afterwards rinse well.

Brown Dye for Wool.—This may be induced by a decoction of oak bark, with variety of shade according to the quantity employed. If the goods be first passed through a mordant of alum the color will be brightened.

Brown for Cotton.—Catechu or terra japonica gives cotton a brown color; blue vitriol turns it to the bronze; green copperas darkens it, when applied as a mordant and the stuff is boiled in the bath. Acetate of alumina as a mordant brightens it. The French color Carmelite is given with catechu, 1 pound; verdigris, 4 ounces; and sal ammoniac, 5 ounces.

Dark Snuff Brown for Wool.—For 50 pounds of goods, take camwood, 10 pounds, boil for 20 minutes, then dip the goods for ¾ of an hour; take them out, and add to the dye, fustic, 25 pounds, boil 12 minutes, and dip the goods ¾ of an hour; then add blue vitriol, 10 ounces, copperas, 2 pounds, 8 ounces; dip again 40 minutes. Add more copperas if the shade is required darker.

Brown for Wool and Silk.—Infusion or decoction of walnut peels dyes wool and silk a brown color, which is brightened by alum. Horse-chestnut peels also impart a brown color; a mordant of muriate of tin turns it on the bronze, and sugar of lead the reddish brown.

Alkali Blue and Nicholson's Blue.—Dissolve 1 pound of the dye in 10 gallons boiling water, and add this by small portions to the dye bath, which should be rendered alkaline by borax. The fabric should be well worked about between each addition of the color. The temperature must be kept under 212° F. To develop the color, wash with water

and pass through a bath containing sulphuric acid.

Aniline Blue.—To 100 pounds of fabric, dissolve 1¼ pounds aniline blue in 3 quarts hot alcohol, strain through a filter, and add it to a bath of 130° F.; also 10 pounds Glauber's salts, and 5 pounds acetic acid. Immerse the goods and handle them well for 20 minutes. Next heat slowly to 200° F.; then add 5 pounds sulphuric acid diluted with water. Let the whole boil 20 minutes longer; then rinse and dry. If the aniline be added in 2 or 3 proportions during the process of coloring, it will facilitate the evenness of the color.

Blue on Cotton.—For 40 pounds of goods, use copperas, 2 pounds; boil and dip 20 minutes; dip in soapsuds, and return to the dye 3 or 4 times; then make a new bath with prussiate of potash, ½ pound; oil of vitriol, 1¼ pints; boil ½ hour, rinse out and dry.

Sky Blue on Cotton.—For 60 pounds of goods, blue vitriol, 5 pounds. Boil a short time, then enter the goods, dip 3 hours, and transfer to a bath of strong limewater. A fine brown color will be imparted to the goods if they are then put through a solution of prussiate of potash.

Blue Dye for Hosiery.—One hundred pounds of wool are colored with 4 pounds Guatemala or 3 pounds Bengal indigo, in the soda or wood vat. Then boil in a kettle a few minutes, 5 pounds of cudbear or 8 pounds of archil paste; add 1 pound of soda, or, better, 1 pail of urine; then cool the dye to about 170° F. and enter the wool. Handle well for about 20 minutes, then take it out, cool, rinse, and dry. It makes no difference whether the cudbear is put in before or after the indigo. Three ounces of aniline purple dissolved in alcohol, ½ pint, can be used instead of the cudbear. Wood spirit is cheaper than alcohol, and is much used by dyers for the purpose of dissolving aniline colors. It produces a very pretty shade, but should never be used on mixed goods which have to be bleached.

Dark-Blue Dye.—This dye is suitable for thibets and lastings. Boil 100 pounds of the fabric for 1½ hours in a solution of alum, 25 pounds; tartar, 4 pounds; mordant, 6 pounds; extract of indigo, 6 pounds; cool as usual. Boil in fresh water from 8 to 10 pounds of logwood, in a bag or otherwise, then cool the dye to 170° F. Reel the fabric quickly at first, then let it boil strongly for 1 hour. This is a very good imitation of indigo blue.

Saxon Blue.—For 100 pounds thibet or comb yarn, use alum, 20 pounds; cream of tartar, 3 pounds; mordant, 2 pounds; extract of indigo, 3 pounds; or carmine, 1 pound, makes a better color. When all is dissolved, cool the kettle to 180° F.; enter and handle quickly at first, then let the fabric boil ½ hour, or until even. Long boiling dims the color. Zephyr worsted yarn ought to be prepared, first, by boiling it in a solution of alum and sulphuric acid; the indigo is added afterwards.

Logwood and Indigo Blue.—For 100 pounds of cloth. Color the cloth first by one or two dips in the vat of indigo blue, and rinse it well, and then boil it in a solution of 20 pounds of alum, 2 pounds of half-refined tartar, and 5 pounds of mordant, for 2 hours; finally take it out and cool. In fresh water boil 10 pounds of good logwood for half an hour in a bag or otherwise; cool off to 170° F. before entering. Handle well over a reel, let it boil for half an hour; then take it out, cool and rinse. This is a very firm blue.

Blue Purple for Silk.—For 40 pounds of goods, take bichromate of potash, 8 ounces; alum, 1 pound; dissolve all and bring the water to a boil, and put in the goods; boil 1 hour. Then empty the dye, and make a new dye with logwood, 8 pounds, or extract of logwood, 1 pound 4 ounces, and boil in this 1 hour longer. Grade the color by using more or less logwood, as dark or light color is wanted.

Blue Purple for Wool.—One hundred pounds of wool are first dipped in the blue vat to a light shade, then boiled in a solution of 15 pounds of alum and 3 pounds of half-refined tartar, for 1¼ hours, the wool taken out, cooled, and let stand 24 hours. Then boil in fresh water 8 pounds of powdered cochineal for a few minutes, cool the kettle to 170° F. Handle the prepared wool in this for 1 hour, when it is ready to cool, rinse and dry. By coloring first with cochineal, as aforesaid, and finishing in the blue vat, the fast purple or dahlia, so much admired in German broadcloths, will be produced. Tin acids must not be used in this color.

To Make Extract of Indigo Blue.—Take of vitriol, 2 pounds, and stir into it finely pulverized indigo, 8 ounces, stirring briskly for the first half hour; then

cover up, and stir 4 or 5 times daily for a few days. Add a little pulverized chalk, stirring it up, and keep adding it as long as it foams; it will neutralize the acid. Keep it closely corked.

Light Silver Drab.—For 50 pounds of goods, use logwood, ½ pound; alum, about the same quantity; boil well, enter the goods, and dip them for 1 hour. Grade the color to any desired shade by using equal parts of logwood and alum.

GRAY DYES:

Slate Dye for Silk.—For a small quantity, take a pan of warm water and about a teacupful of logwood liquor, pretty strong, and a piece of pearlash the size of a nut; take gray-colored goods and handle a little in this liquid, and it is finished. If too much logwood is used, the color will be too dark.

Slate for Straw Hats.—First, soak in rather strong warm suds for 15 minutes to remove sizing or stiffening; then rinse in warm water to get out the soap. Scald cudbear, 1 ounce, in sufficient water to cover the hat; work it in this dye at 180° F., until a light purple is obtained. Have a vessel of cold water, blued with the extract of indigo, ½ ounce, and work or stir the bonnet in this until the tint pleases. Dry, then rinse out with cold water, and dry again in the shade. If the purple is too deep in shade the final slate will be too dark.

Silver Gray for Straw.—For 25 hats, select the whitest hats and soften them in a bath of crystallized soda to which some clean limewater has been added. Boil for 2 hours in a large vessel, using for a bath a decoction of the following: Alum, 4 pounds; tartaric acid, ⅜ pound; some ammoniacal cochineal, and carmine of indigo. A little sulphuric acid may be necessary in order to neutralize the alkali of the cochineal dye. If the last-mentioned ingredients are used, let the hats remain for an hour longer in the boiling bath, then rinse in slightly acidulated water.

Dark Steel.—Mix black and white wool together in the proportion of 50 pounds of black wool to 7½ pounds of white. For large or small quantities, keep the same proportion, mixing carefully and thoroughly.

GREEN DYES:

Aniline Green for Silk.—Iodine green or night green dissolves easily in warm water. For a liquid dye 1 pound may be dissolved in 1 gallon alcohol, and mixed with 2 gallons water, containing 1 ounce sulphuric acid.

Aniline Green for Wool.—Prepare two baths, one containing the dissolved dye and a quantity of carbonate of soda or borax. In this the wool is placed, and the temperature raised to 212° F. A grayish green is produced, which must be brightened and fixed in a second bath of water 100° F., to which some acetic acid has been added. Cotton requires preparation by sumac.

Green for Cotton.—For 40 pounds of goods, use fustic, 10 pounds; blue vitriol, 10 ounces; soft soap, 2½ quarts; and logwood chips, 1 pound 4 ounces. Soak the logwood overnight in a brass vessel, and put it on the fire in the morning, adding the other ingredients. When quite hot it is ready for dyeing; enter the goods at once, and handle well. Different shades may be obtained by letting part of the goods remain longer in the dye.

Green for Silk.—Boil green ebony in water, and let it settle. Take the clear liquor as hot as the hands can bear, and handle the goods in it until of a bright yellow. Take water and put in a little sulphate of indigo; handle goods in this till of the shade desired. The ebony may previously be boiled in a bag to prevent it from sticking to the silk.

Green for Wool and Silk.—Take equal quantities of yellow oak and hickory bark, make a strong yellow bath by boiling, and shade to the desired tint by adding a small quantity of extract of indigo.

Green Fustic Dye.—For 50 pounds of goods, use 50 pounds of fustic with alum, 11 pounds. Soak in water until the strength is extracted, put in the goods until of a good yellow color, remove the chips, and add extract of indigo in small quantities at a time, until the color is satisfactory.

PURPLE AND VIOLET DYES:

Aniline Violet and Purple.—Acidulate the bath by sulphuric acid, or use sulphate of soda; both these substances render the shade bluish. Dye at 212° F. To give a fair middle shade to 10 pounds of wool, a quantity of solution equal to ½ to ¾ ounces of the solid dye will be required. The color of the dyed fabric is improved by washing in soap and water, and then passing through a bath soured by sulphuric acid.

Purple.—For 40 pounds of goods, use

alum, 3 pounds; muriate of tin, 4 teacups; pulverized cochineal, 1 pound; cream of tartar, 2 pounds. Boil the alum, tin, and cream of tartar, for 20 minutes, add the cochineal and boil 5 minutes; immerse the goods 2 hours; remove and enter them in a new dye composed of brazil wood, 3 pounds; logwood, 7 pounds; alum, 4 pounds, and muriate of tin, 8 cupfuls, adding a little extract of indigo.

Purple for Cotton.—Get up a tub of hot logwood liquor, enter 3 pieces, give them 5 ends, and hedge out. Enter them in a clean alum tub, give them 5 ends, and hedge out. Get up another tub of logwood liquor, enter, give them 5 ends, and hedge out; renew the alum tub, give 5 ends in that, and finish.

Purple for Silk.—For 10 pounds of goods, enter the goods in a blue dye bath, and secure a light-blue color, dry, and dip in a warm solution containing alum, 2½ pounds. Should a deeper color be required, add a little extract of indigo.

Solferino and Magenta for Woolen, Silk, or Cotton.—For 1 pound of woolen goods, magenta shade, 96 grains, apothecaries' weight, of aniline red, will be required. Dissolve in a little warm alcohol, using, say, 6 fluidounces, or about 6 gills alcohol per ounce of aniline. Many dyers use wood spirits because of its cheapness. For a solferino shade, use 64 grains aniline red, and dissolve in 4 ounces alcohol, to each 1 pound of goods. Cold water, 1 quart, will dissolve these small quantities of aniline red, but the cleanest and quickest way will be found by using the alcohol, or wood spirits. Clean the cloth and goods by steeping at a gentle heat in weak soapsuds, rinse in several masses of clean water and lay aside moist. The alcoholic solution of aniline is to be added from time to time to the warm or hot dye bath, till the color on the goods is of the desired shade. The goods are to be removed from the dye bath before each addition of the alcoholic solution, and the bath is to be well stirred before the goods are returned. The alcoholic solution should be first dropped into a little water, and well mixed, and the mixture should then be strained into the dye bath. If the color is not dark enough after working from 20 to 30 minutes, repeat the removal of the goods from the bath, and the addition of the solution, and the reimmersion of the goods from 15 to 30 minutes more, or until suited, then remove from the bath and rinse in several masses of clean water, and dry in the shade. Use about 4 gallons water for dye bath for 1 pound of goods; less water for larger quantities.

Violet for Silk or Wool.—A good violet dye may be given by passing the goods first through a solution of verdigris, then through a decoction of logwood, and lastly through alum water. A fast violet may be given by dyeing the goods crimson with cochineal, without alum or tartar, and after rinsing passing them through the indigo vat. Linens or cottons are first galled with 18 per cent of gallnuts, next passed through a mordant of alum, iron liquor, and sulphate of copper, working them well, then worked in a madder bath made with an equal weight of root, and lastly brightened with soap or soda.

Violet for Straw Bonnets.—Take alum, 4 pounds; tartaric acid, 1 pound; chloride of tin, 1 pound. Dissolve and boil, allowing the hats to remain in the boiling solution 2 hours; then add enough decoction of logwood, carmine, and indigo to induce the desired shade, and rinse finally in water in which some alum has been dissolved.

Wine Color.—For 50 pounds of goods, use camwood, 10 pounds, and boil 20 minutes; dip the goods ½ hour, boil again, and dip 40 minutes; then darken with blue vitriol, 15 ounces, and 5 pounds of copperas.

Lilac for Silk.—For 5 pounds of silk, use archil, 7½ pounds, and mix well with the liquor. Make it boil ½ hour, and dip the silk quickly; then let it cool, and wash in river water. A fine half violet, or lilac, more or less full, will be obtained.

RED, CRIMSON, AND PINK DYES:

Aniline Red.—Inclose the aniline in a small muslin bag. Have a kettle (tin or brass) filled with moderately hot water and rub the substance out. Then immerse the goods to be colored. and in a short time they are done. It improves the color to wring the goods out of strong soapsuds before putting them in the dye. This is a permanent color on wool or silk.

Red Madder.—To 100 pounds of fabric, use 20 pounds of alum, 5 pounds of tartar, and 5 pounds of muriate of tin. When these are dissolved, enter the goods and let them boil for 2 hours, then take out, let cool, and lay overnight. Into fresh water, stir 75 pounds of good

madder, and enter the fabric at 120° F. and bring it up to 200° F. in the course of an hour. Handle well to secure evenness, then rinse and dry.

Red for Wool.—For 40 pounds of goods, make a tolerably thick paste of lac dye and sulphuric acid, and allow it to stand for a day. Then take tartar, 4 pounds, tin liquor, 2 pounds 8 ounces, and 3 pounds of the paste; make a hot bath with sufficient water, and enter the goods for ¾ hour; afterwards carefully rinse and dry.

Crimson for Silk.—For 1 pound of goods, use alum, 3 ounces; dip at hand heat 1 hour; take out and drain, while making a new dye, by boiling for 10 minutes, cochineal, 3 ounces; bruised nutgalls, 2 ounces; and cream of tartar, ½ ounce, in 1 pail of water. When a little cool begin to dip, raising the heat to a boil, continuing to dip 1 hour. Wash and dry.

Aniline Scarlet.—For every 40 pounds of goods, dissolve 5 pounds white vitriol (sulphate of zinc) at 180° F., place the goods in this bath for 10 minutes, then add the color, prepared by boiling for a few minutes, 1 pound aniline scarlet in 3 gallons water, stirring the same continually. This solution has to be filtered before being added to the bath. The goods remain in the latter for 15 minutes, when they have become browned and must be boiled for another half hour in the same bath after the solution of sal ammoniac. The more of this is added the deeper will be the shade.

Scarlet with Cochineal.—For 50 pounds of wool, yarn, or cloth, use cream of tartar, 1 pound 9 ounces; cochineal, pulverized, 12½ ounces; muriate of tin or scarlet spirit, 8 pounds. After boiling the dye, enter the goods, work them well for 15 minutes, then boil them 1½ hours, slowly agitating the goods while boiling, wash in clean water, and dry out of the sun.

Scarlet with Lac Dye.—For 100 pounds of flannel or yarn, take 25 pounds of ground lac dye, 15 pounds of scarlet spirit (made as per directions below), 5 pounds of tartar, 1 pound of flavine, or according to shade, 1 pound of tin crystals, 5 pounds of muriatic acid. Boil all for 15 minutes, then cool the dye to 170° F. Enter the goods, and handle them quickly at first. Let boil 1 hour, and rinse while yet hot, before the gum and impurities harden. This color stands scouring with soap better than cochineal scarlet. A small quantity of sulphuric acid may be added to dissolve the gum.

Muriate of Tin or Scarlet Spirit.—Take 16 pounds muriatic acid, 22° Bé.; 1 pound feathered tin, and water, 2 pounds. The acid should be put in a stoneware pot, and the tin added, and allowed to dissolve. The mixture should be kept a few days before using. The tin is feathered or granulated by melting in a suitable vessel, and pouring it from a height of about 5 feet into a pailful of water. This is a most powerful agent in certain colors, such as scarlets, oranges, pinks, etc.

Pink for Cotton.—For 40 pounds of goods, use redwood, 20 pounds; muriate of tin, 2½ pounds. Boil the redwood 1 hour, turn off into a large vessel, add the muriate of tin, and put in the goods. Let it stand 5 or 10 minutes, and a good fast pink will be produced.

Pink for Wool.—For 60 pounds of goods, take alum, 5 pounds 12 ounces; boil and immerse the goods 50 minutes; then add to the dye cochineal well pulverized, 1 pound, 4 ounces; cream of tartar, 5 pounds; boil and enter the goods while boiling, until the color is satisfactory.

YELLOW, ORANGE, AND BRONZE DYES:

Aniline Yellow.—This color is slightly soluble in water, and for dyers' use may be used directly for the preparation of the bath dye, but is best used by dissolving 1 pound of dye in 2 gallons alcohol. Temperature of bath should be under 200° F. The color is much improved and brightened by a trace of sulphuric acid.

Yellow for Cotton.—For 40 pounds goods, use sugar of lead, 3 pounds 8 ounces; dip the goods 2 hours. Make a new dye with bichromate of potash, 2 pounds; dip until the color suits, wring out and dry. If not yellow enough repeat the operation.

Yellow for Silk.—For 10 pounds of goods, use sugar of lead, 7½ ounces; alum, 2 pounds. Enter the goods, and let them remain 12 hours; remove them, drain, and make a new dye with fustic, 10 pounds. Immerse until the color suits.

Orange.—I.—For 50 pounds of goods, use argal, 3 pounds; muriate of tin, 1 quart; boil and dip 1 hour; then add to the dye, fustic, 25 pounds; madder, 2½

quarts; and dip again 40 minutes. If preferred, cochineal, 1 pound 4 ounces, may be used instead of the madder, as a better color is induced by it.

II.—For 40 pounds of goods, use sugar of lead, 2 pounds, and boil 15 minutes. When a little cool, enter the goods, and dip for 2 hours, wring them out, make a fresh dye with bichromate of potash, 4 pounds; madder, 1 pound, and immerse until the desired color is secured. The shade may be varied by dipping in limewater.

Bronze.—Sulphate or muriate of manganese dissolved in water with a little tartaric acid imparts a beautiful bronze tint. The stuff after being put through the solution must be turned through a weak lye of potash, and afterwards through another of chloride of lime, to brighten and fix it.

Prussiate of copper gives a bronze or yellowish-brown color to silk. The piece well mordanted with blue vitriol may be passed through a solution of prussiate of potash.

Mulberry for Silk.—For 5 pounds of silk, use alum, 1 pound 4 ounces; dip 50 minutes, wash out, and make a dye with brazil wood, 5 ounces, and logwood, 1½ ounces, by boiling together. Dip in this ½ hour; then add more brazil wood and logwood, equal parts, until the color suits.

FEATHER DYES.

I.—Cut some white curd soap in small pieces, pour boiling water on them, and add a little pearlash. When the soap is quite dissolved, and the mixture cool enough for the hand to bear, plunge the feathers into it, and draw them through the hand till the dirt appears squeezed out of them; pass them through a clean lather with some blue in it; then rinse them in cold water with blue to give them a good color. Beat them against the hand to shake off the water, and dry by shaking them near a fire. When perfectly dry, coil each fiber separately with a blunt knife or ivory folder.

II.—**Black.**—Immerse for 2 or 3 days in a bath, at first hot, of logwood, 8 parts, and copperas or acetate of iron, 1 part.

III.—**Blue.**—Same as II, but with the indigo vat.

IV.—**Brown.**—By using any of the brown dyes for silk or woolen.

V.—**Crimson.**—A mordant of alum, followed by a hot bath of brazil wood, afterwards by a weak dye of cudbear.

VI.—**Pink or Rose.**—With safflower or lemon juice.

VII.—**Plum.**—With the red dye, followed by an alkaline bath.

VIII.—**Red.**—A mordant of alum, followed by a bath of brazil wood.

IX.—**Yellow.**—A mordant of alum, followed by a bath of turmeric or weld.

X.—**Green.**—Take of verdigris and verditer, of each 1 ounce; gum water, 1 pint; mix them well and dip the feathers, they having been first soaked in hot water, into the said mixture.

XI.—**Purple.**—Use lake and indigo.

XII.—**Carnation.**—Vermilion and smalt.

DYES FOR ARTIFICIAL FLOWERS.

The French employ velvet, fine cambric, and kid for the petals, and taffeta for the leaves. Very recently thin plates of bleached whalebone have been used for some portions of the artificial flowers.

Colors and Stains.—I.—**Blue.**—Indigo dissolved in oil of vitriol, and the acid partly neutralized with salt of tartar or whiting.

II.—**Green.**—A solution of distilled verdigris.

III.—**Lilac.**—Liquid archil.

IV.—**Red.**—Carmine dissolved in a solution of salt of tartar, or in spirts of hartshorn.

V.—**Violet.**—Liquid archil mixed with a little salt of tartar.

VI.—**Yellow.**—Tincture of turmeric. The colors are generally applied with the fingers.

DYES FOR FURS:

I.—**Brown.**—Use tincture of logwood.

II.—**Red.**—Use ground brazil wood, ½ pound; water, 1½ quarts; cochineal, ½ ounce; boil the brazil wood in the water 1 hour; strain and add the cochineal; boil 15 minutes.

III.—**Scarlet.**—Boil ½ ounce saffron in ½ pint of water, and pass over the work before applying the red.

IV.—**Blue.**—Use logwood, 7 ounces; blue vitriol, 1 ounce; water, 22 ounces; boil.

V.—**Purple.**—Use logwood, 11 ounces; alum, 6 ounces; water, 29 ounces.

VI.—**Green.**—Use strong vinegar, 1½ pints; best verdigris, 2 ounces, ground fine; sap green, ¼ ounce; mix all together and boil.

DYES FOR HATS.

The hats should be at first strongly galled by boiling a long time in a decoction of galls with a little logwood so that the dye may penetrate into their substance; after which a proper quantity of vitriol and decoction of logwood, with a little verdigris, are added, and the hats kept in this mixture for a considerable time. They are afterwards put into a fresh liquor of logwood, galls, vitriol, and verdigris, and, when the hats are costly, or of a hair which with difficulty takes the dye, the same process is repeated a third time. For obtaining the most perfect color, the hair or wool is dyed blue before it is formed into hats.

The ordinary bath for dyeing hats, employed by London manufacturers, consists, for 12 dozen, of 144 pounds of logwood; 12 pounds of green sulphate of iron or copperas; 7½ pounds verdigris. The logwood having been introduced into the copper and digested for some time, the copperas and verdigris are added in successive quantities, and in the above proportions, along with every successive 2 or 3 dozen of hats suspended upon the dripping machine. Each set of hats, after being exposed to the bath with occasional airings during 40 minutes, is taken off the pegs, and laid out upon the ground to be more completely blackened by the peroxydizement of the iron with the atmospheric oxygen. In 3 or 4 hours the dyeing is completed. When fully dyed, the hats are well washed in running water.

Straw hats or bonnets may be dyed black by boiling them 3 or 4 hours in a strong liquor of logwood, adding a little copperas occasionally. Let the bonnets remain in the liquor all night; then take out to dry in the air. If the black is not satisfactory, dye again after drying. Rub inside and out with a sponge moistened in fine oil; then block.

I.—**Red Dye.**—Boil ground brazil wood in a lye of potash, and boil your straw hats in it.

II.—**Blue Dye.**—Take a sufficient quantity of potash lye, 1 pound of litmus or lacmus, ground; make a decoction and then put in the straw, and boil it.

TO DYE, STIFFEN, AND BLEACH FELT HATS.

Felt hats are dyed by repeated immersion, drawing and dipping in a hot watery solution of logwood, 38 parts; green vitriol, 3 parts; verdigris, 2 parts; repeat the immersions and drawing with exposure to the air 13 or 14 times, or until the color suits, each step in the process lasting from 10 to 15 minutes. Aniline colors may be advantageously used instead of the above. For a stiffening, dissolve borax, 10 parts; carbonate of potash, 3 parts, in hot water; then add shellac, 50 parts, and boil until all is dissolved; apply with a sponge or a brush, or by immersing the hat when it is cold, and dip at once in very dilute sulphuric or acetic acid to neutralize the alkali and fix the shellac. Felt hats can be bleached by the use of sulphuric acid gas.

LIQUID DYE COLORS.

These colors, thickened with a little gum, may be used as inks in writing, or as colors to tint maps, foils, artificial flowers, etc., or to paint on velvet:

I.—**Blue.**—Dilute Saxon blue or sulphate of indigo with water. If required for delicate work, neutralize with chalk.

II.—**Purple.**—Add a little alum to a strained decoction of logwood.

III.—**Green.**—Dissolve sap green in water and add a little alum.

IV.—**Yellow.**—Dissolve annatto in a weak lye of subcarbonate of soda or potash.

V.—**Golden Color.**—Steep French berries in hot water, strain, and add a little gum and alum.

VI.—**Red.**—Dissolve carmine in ammonia, or in weak carbonate of potash water, or infuse powdered cochineal in water, strain, and add a little gum in water.

UNCLASSIFIED DYERS' RECIPES:

To Cleanse Wool.—Make a hot bath composed of water, 4 parts; ammonia, 1 part; enter the wool, teasing and opening it out to admit the full action of the liquid. After 20 minutes' immersion, remove from the liquid and allow it to drain; then rinse in clean running water, and spread out to dry. The liquid is good for subsequent operations, only keep up the proportions, and use no soap.

To Extract Oil Spots from Finished Goods.—Saturate the spot with benzine; then place two pieces of very soft blotting paper under and two upon it, press well with a hot iron, and the grease will be absorbed.

New Mordant for Aniline Colors.—Immerse the goods for some hours in a bath of cold water in which chloride or acetate of zinc has been dissolved until the solution shows 2° Bé. For the wool the

mordanting bath should be at a boiling heat, and the goods should also be placed in a warm bath of tannin, 90° F., for half an hour. In dyeing, a hot solution of the color must be used to which should be added, in the case of the cotton, some chloride of zinc, and, in the case of the wool, a certain amount of tannin solution.

To Render Aniline Colors Soluble in Water.—A solution of gelatin in acetic acid of almost the consistence of syrups is first made, and the aniline in fine is gradually added, stirring all the time so as to make a homogeneous paste. The mixture is then to be heated over a water bath to the temperature of boiling water and kept at that heat for some time.

Limewater for Dyers' Use.—Put some lime, 1 pound, and strong limewater, 1½ pounds, into a pail of water; rummage well for 7 or 8 minutes. Then let it rest until the lime is precipitated and the water clear; add this quantity to a tubful of clear water.

To Renew Old Silks.—Unravel and put them in a tub, cover with cold water, and let them remain 1 hour. Dip them up and down, but do not wring; hang up to drain, and iron while very damp.

Fuller's Purifier for Cloths.—Dry, pulverize, and sift the following ingredients: Fuller's earth, 6 pounds; French chalk, 4 ounces; pipe clay, 1 pound. Make into a paste with rectified oil of turpentine, 1 ounce; alcohol, 2 ounces; melted oil soap, 1½ pounds. Compound the mixture into cakes of any desired size, keeping them in water, or small wooden boxes.

To Fix Dyes.—Dissolve 20 ounces of gelatin in water, and add 3 ounces of bichromate of potash. This is done in a dark room. The coloring matter is then added and the goods submitted thereto, after which they are exposed to the action of light. The pigment thus becomes insoluble in water and the color is fast.

DYES AND DYESTUFFS.

Prominent among natural dyestuffs is the coloring matter obtained from logwood and known as "hæmatein." The color-forming substance (or chromogen), hæmatoxylin, exists in the logwood partly free and partly as a glucoside. When pure, hæmatoxylin forms nearly colorless crystals, but on oxidation, especially in the presence of an alkali, it is converted into the coloring matter hæmatein, which forms colored lakes with metallic bases, yielding violets, blues, and blacks with various mordants. Logwood comes into commerce in the form of logs, chips, and extracts. The chips are moistened with water and exposed in heaps so as to induce fermentation, alkalies and oxidizing agents being added to promote the "curing" or oxidation. When complete and the chips have assumed a deep reddish-brown color, the decoction is made which is employed in dyeing. The extract offers convenience in transportation, storage, and use. It is now usually made from logwood chips that have not been cured. The chips are treated in an extractor, pressure often being used. The extract is sometimes adulterated with chestnut, hemlock, and quercitron extracts, and with glucose or molasses.

Fustic is the heart-wood of certain species of trees indigenous to the West Indies and tropical South America. It is sold as chips and extract, yields a coloring principle which forms lemon-yellow lakes with alumina and is chiefly used in dyeing wool. Young fustic is the heart-wood of a sumac native to the shores of the Mediterranean, which yields an orange-colored lake with alumina and tin salts.

Cutch, or catechu, is obtained from the wood and pods of the *Acacia catechu*, and from the betel nut, both native in India. Cutch appears in commerce in dark-brown lumps, which form a dark-brown solution with water. It contains catechu-tannic acid, as tannin and catechin, and is extensively used in weighting black silks, as a mordant for certain basic coal-tar dyes, as a brown dye on cotton, and for calico printing.

Indigo, which is obtained from the glucoside indican existing in the indigo plant and in woad, is one of the oldest dyestuffs. It is obtained from the plant by a process of fermentation and oxidation. Indigo appears in commerce in dark-blue cubical cakes, varying very much in composition as they often contain indigo red and indigo brown, besides moisture, mineral matters, and glutinous substances. Consequently the color varies. Powdered indigo dissolves in concentrated fuming sulphuric acid, forming monosulphonic and disulphonic acids. On neutralizing these solutions with sodium carbonate and precipitating the indigo carmine with common salt there is obtained the indigo extract, soluble indigo, and indigo carmine of commerce. True indigo carmine is the sodium salt of the disulphonic acid, and when sold dry it is called "indigotine."

One of the most important of the recent

achievements of chemistry is the synthetic production of indigo on a commercial scale.

Artificial dyestuffs assumed preponderating importance with the discovery of the lilac color mauve by Perkin in 1856, and fuchsine or magenta by Verguin in 1895, for with each succeeding year other colors have been discovered, until at the present time there are several thousand artificial organic dyes or colors on the market. Since the first of these were prepared from aniline or its derivatives the colors were known as "aniline dyes," but as a large number are now prepared from other constituents of coal tar than aniline they are better called "coal-tar dyestuffs." There are many schemes of classification. Benedikt-Knecht divides them into I, aniline or amine dyes; II, phenol dyes; III, azo dyes; IV, quinoline and acridine derivatives; V, anthracene dyes; and VI, artificial indigo.

Of the anthracene dyes, the alizarine is the most important, since this is the coloring principle of the madder. The synthesis of alizarine from anthracene was effected by Gräbe and Liebermann in 1868. This discovery produced a complete revolution in calico printing, turkey-red dyeing, and in the manufacture of madder preparations. Madder finds to-day only a very limited application in the dyeing of wool.

In textile dyeing and printing, substances called mordants are largely used, either to fix or to develop the color on the fiber. Substances of mineral origin, such as salts of aluminum, chromium, iron, copper, antimony, and tin, principally, and many others to a less extent and of organic origin, like acetic, oxalic, citric, tartaric, and lactic acid, sulphonated oils, and tannins are employed as mordants.

Iron liquor, known as black liquor or pyrolignite of iron, is made by dissolving scrap iron in pyroligneous acid. It is used as a mordant in dyeing silks and cotton and in calico printing.

Red liquor is a solution of aluminum acetate in acetic acid, and is produced by acting on calcium or lead acetate solutions with aluminum sulphate or the double alums, the supernatant liquid forming the red liquor. The red liquor of the trade is often the sulpho-acetate of alumina resulting when the quantity of calcium or lead acetate is insufficient to completely decompose the aluminum salt. Ordinarily the solutions have a dark-brown color and a strong pyroligneous odor. It is called red liquor because it was first used in dyeing reds. It is employed as a mordant by the cotton dyer and largely by the printer.

Non-Poisonous Textile and Egg Dyes for Household Use.—The preparation of non-poisonous colors for dyeing fabrics and eggs at home constitutes a separate department in the manufacture of dyestuffs.

Certain classes of aniline dyes may be properly said to form the materials. The essence of this color preparation consists chiefly in diluting or weakening the coal-tar dyes, made in the aniline factories, and bringing them down to a certain desired shade by the addition of certain chemicals suited to their varying characteristics, which, though weakening the color, act at the same time as the so-called mordants.

The anilines are divided with reference to their characteristic reactions into groups of basic, acid, moderately acid, as well as dyes that are insoluble in water.

In cases where combinations of one or more colors are needed, only dyes of similar reaction can be combined, that is, basic with basic, and acid with acid.

For the purpose of reducing the original intensity of the colors, and also as mordants, dextrin, Glauber's salt, alum, or aluminum sulphate is pressed into service. Where Glauber's salt is used, the neutral salt is exclusively employed, which can be had cheaply and in immense quantities in the chemical industry. Since it is customary to pack the color mixtures in two paper boxes, one stuck into the other, and moreover since certain coal-tar dyes are only used in large crystals, it is only reasonable that the mordants should be calcined and not put up in the shape of crystallized salts, particularly since these latter are prone to absorb the moisture from the air, and when thus wet likely to form a compact mass very difficult to dissolve. This inconvenience often occurs with the large crystals of fuchsine and methyl violet. Because these two colors are mostly used in combination with dextrin to color eggs, and since dextrin is also very hygroscopic, it is better in these individual cases to employ calcined Glauber's salt. In the manufacture of egg colors the alkaline coloring coal-tar dyes are mostly used, and they are to be found in a great variety of shades.

Of the non-poisonous egg dyes, there are some ten or a dozen numbers, new red, carmine, scarlet, pink, violet, blue, yellow, orange, green, brown, black, heliotrope, etc., which when mixed will

enable the operator to form shades almost without number.

The manufacture of the egg dyes as carried on in the factory consists in a mechanical mixing of basic coal-tar dyestuffs, also some direct coloring benzidine dyestuffs, with dextrin in the ratio of about 1 part of aniline dye to 8 parts of dextrin; under certain circumstances, according to the concentrated state of the dyes, the reducing quantity of the dextrin may be greatly increased. As reducing agents for these colors insoluble substances may also be employed. A part also of the egg dyes are treated with the neutral sulphate; for instance, light brilliant green, because of its rubbing off, is made with dextrin and Glauber's salt in the proportion of 1:3:3.

For the dyeing of eggs such color mixtures are preferably employed as contain along with the dye proper a fixing agent (dextrin) as well as a medium for the superficial mordanting of the eggshell. The colors will then be very brilliant.

Here are some recipes:

Color	Dyestuff	Parts by Weight	Cit. Acid	Dextrin
Blue...	Marine blue B. N...	3.5	35.0	60.0
Brown..	Vesuvin S.........	30.0	37.5	30.0
Green..	Brilliant green O...	13.5	18.0	67.5
Orange.	Orange II.........	9.0	18.0	75.0
Red...	Diamond fuchsine I.	3.5	18.0	75.0
Pink...	Eosin A..........	4.5	—	90.0
Violet..	Methyl violet 6 B..	3.6	18.0	75.0
Yellow.	Naphthol yellow S.	13.5	36.0	67.5

Very little of these mixtures suffices for dyeing five eggs. The coloring matter is dissolved in 600 parts by weight of boiling water, while the eggs to be dyed are boiled hard, whereupon they are placed in the dye solution until they seem sufficiently colored. The dyes should be put up in waxed paper.

Fast Stamping Color.—Rub up separately, 20 parts of cupric sulphate and 20 parts of anilic hydrochlorate, then mix carefully together, after adding 10 parts of dextrin. The mixture is next ground with 5 parts of glycerine and sufficient water until a thick, uniform, paste-like mass results, adapted for use by means of stencil and bristle-brush. Aniline black is formed thereby in and upon the fiber, which is not destroyed by boiling.

New Mordanting Process.—The ordinary method of mordanting wool with a bichromate and a reducing agent always makes the fiber more or less tender, and Amend proposed to substitute the use of a solution of chromic acid containing 1 to 2 per cent of the weight of the wool, at a temperature not exceeding 148° F., and to treat it afterwards with a solution of sodium bisulphite. According to a recent French patent, better results are obtained with neutral or slightly basic chromium sulphocyanide. This salt, if neutral or only slightly basic will mordant wool at 148° F. The double sulphocyanide of chromium and ammonium, got by dissolving chromic oxide in ammonium sulphocyanide, can also be used. Nevertheless, in order to precipitate chromium chromate on the fiber, it is advisable to have a soluble chromate and a nitrate present, as well as a soluble copper salt and a free acid. One example of the process is as follows: Make the bath with 2 to 3 per cent of ammoniochromium sulphocyanide, one-half of 1 per cent sodium bichromate, one-third of 1 per cent sodium nitrite, one-third of 1 per cent sulphate of copper, and 1.5 per cent sulphuric acid—percentages based on the weight of the wool. Enter cold and slowly heat to about 140° to 150° F. Then work for half an hour, lift and rinse. The bath does not exhaust and can be reinforced and used again.

Process for Dyeing in Khaki Colors.—Bichromate of potash or of soda, chloride of manganese, and a solution of acetate of soda or formiate of soda (15° Bé.) are dissolved successively in equal quantities.

The solution thus composed of these three salts is afterwards diluted at will, according to the color desired, constituting a range from a dark brown to a light olive green shade. The proportions of the three salts may be increased or diminished, in order to obtain shades more or less bister.

Cotton freed from its impurities by the usual methods, then fulled as ordinarily, is immersed in the bath. After a period, varying according to the results desired, the cotton, threads, or fabrics of cotton, are washed thoroughly and plunged, still wet, into an alkaline solution, of which the concentration ought never to be less than 14° Bé. This degree of concentration is necessary to take hold of the fiber when the cotton comes in contact with the alkaline bath, and by the contraction which takes place the oxides of chrome and of manganese remain fixed in the fibers.

This second operation is followed by washing in plenty of water, and then the cotton is dried in the open air. If the color is judged to be too pale, the threads or fabrics are immersed again in the initial bath, left the necessary time for obtaining the desired shade, and then

washed, but without passing them through an alkaline bath. This process furnishes a series of khaki colors, solid to light, to fulling and to chlorine.

LAKES:

Scarlet Lake.—In a vat holding 120 gallons provided with good agitating apparatus, dissolve 8 pounds potash alum in 10 gallons hot water and add 50 gallons cold water. Prepare a solution of 2 pounds ammonia soda and add slowly to the alum solution, stirring all the time. In a second vessel dissolve 5 pounds of brilliant scarlet aniline, by first making it into a paste with cold water and afterwards pouring boiling water over it; now let out steam into the vat until a temperature of 150° to 165° F. is obtained. Next dissolve 10 pounds barium chloride in 10 gallons hot water in a separate vessel, add this very slowly, stir at least 3 hours, keeping up temperature to the same figures. Fill up vat with cold water and leave the preparation for the night. Next morning the liquor (which should be of a bright red color) is drawn off, and cold water again added. Wash by decantation 3 times, filter, press gently, and make into pulp.

It is very important to precipitate the aluminum cold, and heat up before adding the dyestuff. The chemicals used for precipitating must be added very slowly and while constantly stirring. The quantity used for the three washings is required each time to be double the quantity originally used.

I.—Madder Lakes. — Prepare from the root 1 pound best madder, alum water (1 pound alum with 1½ gallons of water), saturated solution of carbonate of potash (¾ pound carbonate of potash to ½ gallon of water).

The madder root is inclosed in a linen bag of fine texture, and bruised with a pestle in a large mortar with 2 gallons of water (free from lime) added in small quantities at a time, until all the coloring matter is extracted. Make this liquor boil, and gradually pour into the boiling water solution. Add the carbonate of potash solution gradually, stirring all the time. Let the mixture stand for 12 hours and drop and dry as required.

II.—Garancine Process.—This is the method usually employed in preference to that from the root. Garancine is prepared by steeping madder root in sulphate of soda and washing.

Garancine	2 pounds
Alum (dissolved in a little water)	2 pounds
Chloride of tin	½ ounce

Sufficient carbonate of potash or soda to precipitate the alum.

Boil the garancine in 4 gallons of pure water; add the alum, and continue boiling from 1 to 2 hours. Allow the product to partially settle and filter through flannel before cooling. Add to the filtrate the chloride of tin, and sufficient of the potash or soda solution to precipitate the alum; filter through flannel and wash well. The first filtrate may be used for lake of an inferior quality, and the garancine originally employed may also be treated as above, when a lake slightly inferior to the first may be obtained.

Maroon Lake.—Take of a mixture made of:

⅔ Sapan wood, ⅓ Lima wood	56 parts
Soda crystals	42 parts
Alum	56 parts

Extract the color from the woods as for rose pink, and next boil the soda and alum together and add to the woods solution cold. This must be washed clean before adding to the wood liquor.

Carnation Lake.—

Water	42 gallons
Cochineal	12 pounds
Salts of tartar	1½ pounds
Potash alum	¾ pound
Nitrous acid, nitromuriate of tin	44 pounds
Muriatic acid, nitromuriate of tin	60 pounds
Pure block tin, nitromuriate of tin	22 pounds

Should give specific gravity 1.310.

Boil the water with close steam, taking care that *no iron* touches it; add the cochineal and boil for not more than five minutes; then turn off the steam and add salts of tartar and afterwards carefully add the alum. If it should not rise, put on steam until it does, pass through a 120-mesh sieve into a settling vat, and let it stand for 48 hours (not for precipitation). Add gradually nitromuriate of tin until the test on blotting paper (given below) shows that the separation is complete. Draw off clear water after it has settled, and filter. To test, rub a little of the paste on blotting paper, then dry on steam chest or on the hand, and if on bending it cracks, too much tin has been used.

To Test the Color to See if it is Precipitating.—Put a drop of color on white blotting paper, and if the color spreads, it is not precipitating. If there is a color-

less ring around the spot of color it shows that precipitation is taking place; if the white ring is too strong, too much has been used.

BLACK LAKES FOR WALL-PAPER MANUFACTURE:

Bluish-Black Lake.—Boil well 220 parts of Domingo logwood in 1,000 parts of water to which 2 parts of ammonia soda have been added; to the boiling logwood add next 25 parts of green vitriol and then 3.5 parts of sodium bichromate. The precipitated logwood lake is washed out well twice and then filtered.

Black Lake A1.—Logwood extract, Sanford, 120 parts; green vitriol, 30 parts; acetic acid, 7° Bé., 10 parts; sodium bichromate, 16 parts; powdered alum, 20 parts. The logwood extract is first dissolved in boiling water and brought to 25° Bé. by the addition of cold water. Then the remaining ingredients are added in rotation, the salts in substance, finely powdered, with constant stirring. After the precipitation, wash twice and filter.

Aniline Black Lake.—In the precipitating vat filled with 200 parts of cold water enter with constant stirring in the order mentioned the following solutions kept in readiness: Forty parts of alum dissolved in 800 parts of water; 10 parts of calcined soda dissolved in 100 parts of water; 30 parts of azo black dissolved in 1,500 parts of water; 0.6 parts of "brilliant green" dissolved in 100 parts of water; 0.24 parts of new fuchsine dissolved in 60 parts of water; 65 parts of barium chloride dissolved in 1,250 parts of water. Allow to settle for 24 hours, wash the lake three times and filter it.

Carmine Lake for Wall Paper and Colored Papers.—Ammonia soda (98 per cent), 57.5 parts by weight; spirits (96 per cent), 40 parts by weight; corallin (dark), 10 parts by weight; corallin (pale), 5 parts by weight; spirit of sal ammoniac (16° Bé.), 8 parts by weight; sodium phosphate, 30 parts by weight; stannic chloride, 5 parts by weight; barium chloride, 75 parts by weight. Dissolve the corallin in the spirit, and filter the solution carefully into eight bottles, each containing 1 part of the above quantity of spirit of sal ammoniac, and let stand. The soda should meanwhile be dissolved in hot water and the solution run into the stirring vat, in which there is cold water to the height of 17 inches. Add the sodium phosphate, which has been dissolved in a copper vessel, then the corallin solution, and next the stannic chloride diluted with 3 pailfuls of cold water. Lastly the barium chloride solution is added. The day previous barium chloride is dissolved in a cask in as little boiling water as possible, and the receptacle is filled entirely with cold water. On the day following, allow the same to run in slowly during a period of three-fourths of an hour, stir till evening, allow to settle for 2 days, draw off and filter.

English Pink.—

Quercitron bark....	200 parts
Lime..............	10 parts
Alum..............	10 parts
Terra alba.........	300 parts
Whiting............	200 parts
Sugar of lead.......	7 parts

Put the bark into a tub, slake lime in another tub, and add the clear limewater to wash the bark; repeat this 3 times, letting the bark stand in each water 24 hours. Run liquor into the tub below and add the terra alba and whiting; wash well in the top tub and run into liquor below through a hair sieve, stirring well.

Dissolve the sugar of lead in warm water and pour gently into the tub, stirring all the time; then dissolve the alum and run in while stirring; press slightly, drop, and dry as required.

Dutch Pink.—

I.—	Quercitron bark...	200 parts
	Lime............	20 parts
	Alum............	20 parts
	Whiting..........	100 parts
	Terra alba........	200 parts
	White sugar of lead	10 parts
II.—	Quercitron bark...	300 parts
	Lime............	10 parts
	Alum............	10 parts
	Terra alba........	400 parts
	Whiting..........	100 parts
	Sugar of lead......	7 parts

Put the bark into a tub with cold water, slake 28 pounds of lime, and add the limewater to the bark. (This draws all the color out of the wood.) Dissolve alum in water and run it into bark liquor. The alum solution must be just warm. Dissolve sugar of lead and add it to above, and afterwards add the terra alba and whiting. The product should now be in a pulp, and must be dropped and dried as required.

Rose Pink.—I.—Light.

Sapan wood.......	100 parts
Lima.............	100 parts
Paris white........	200 parts
Alum............	210 parts

II.—Deep.

Sapan wood.......	300 parts
Lima.............	300 parts
Terra alba........	400 parts
Paris white........	120 parts
Lime.............	12 parts
Alum.............	200 parts

III.—

Sapan wood.......	200 parts
Alum.............	104 parts
Whiting..........	124 parts

Boil the woods together in 4 waters and let the products stand until cold; wash in the whiting and terra alba through a hair sieve, and afterwards run in the alum. If a deep color is required slake 12 pounds lime and run it in at the last through a hair sieve. Let the alum be just warm or it will show in the pink.

DYES, COLORS, ETC., FOR TEXTILE GOODS:

Aniline Black.—This black is produced by carefully oxidizing aniline hydrochloride. The exact stage of oxidation must be carefully regulated or the product will be a different body (quinone). There are several suitable oxidizing agents, such as chromic acid, potassic bichromate, ferrocyanide of potassium, etc., but one of the easiest to manipulate is potassic chlorate, which by reacting on copper sulphate produces potassic sulphate and copper chlorate. This is easily decomposed, its solution giving off gases at 60° F. which consist essentially of chloride anhydrate. But one of the most useful agents for the production of aniline black is vanadate of ammonia, 1 part of which will do the work of 4,000 parts of copper. Many other salts besides copper may be used for producing aniline black, but the following method is one of the best to follow in making this dye:

Aniline hydrochloride..............	40 parts
Potassic chlorate....	20 parts
Copper sulphate....	40 parts
Chloride of ammonia (sal ammoniac)	16 parts
Warm water at 60° F..............	500 parts

After warming a few minutes the mass froths up. The vapor should not be inhaled. Then set aside, and if the mass is not totally black in a few hours, again heat to 60° F., and expose to the air for a few days, and finally wash away all the soluble salts and the black is fit for use.

Aniline Black Substitutes.—I.—Make a solution of

Aniline (fluid measure)	30 parts
Toluidine (by weight).	10 parts
Pure hydrochloric acid, B. P. (fluid measure)	60 parts
Soluble gum arabic (fluid measure).....	60 parts

Dissolve the toluidine in the aniline and add the acid, and finally the mucilage.

II.—Mix together at gentle heat:

Starch paste......	13 quarts
Potassic chlorate..	350 scruples
Sulphate of copper.	300 scruples
Sal ammoniac.....	300 scruples
Aniline hydrochloride............	800 scruples

Add 5 per cent of alizarine oil, and then steep it for 2 hours in the dye bath of red liquor of 2½° Tw. Dye in a bath made up of ½ ounce of rose bengal and 1½ ounces of red liquor to every 70 ounces of cotton fabric dyed, first entering the fabric at 112° F., and raising it to 140° F., working for 1 hour, or until the desirable shade is obtained; then rinse and dry.

Blush Pink on Cotton Textile.—Rose bengal or fast pink will give this shade. The mordant to use is a 5 per cent solution of stannate of soda and another 5 per cent solution of alum.

Dissolve in a vessel (*a*) 8½ parts of chloride of copper in 30 parts of water, and then add 10 parts chloride of sodium and 9½ parts liquid ammonia.

In a second vessel dissolve (*b*) 30 parts aniline hydrochlorate in 20 parts of water, and add 20 parts of a solution of gum arabic prepared by dissolving 1 part of gum in 2 parts of water.

Finally mix 1 part of *a* with 4 parts of *b*; expose the mixture to the air for a few days to develop from a greenish to a black color. Dilute for use, or else dry the thick compound to a powder.

If new liquor is used as the mordant, mix 1 part of this with 4 parts of water, and after working the fabric for 1 to 2 hours in the cold liquor, wring or squeeze it out and dry; before working it in the dye liquor, thoroughly wet the fabric by rinsing it in hot water at a spring boil; then cool by washing in the dye bath until the shade desired is attained, and again rinse and dry.

The red liquor or acetate of aluminum may be made by dissolving 13 ounces of alum in 69 ounces of water and mixing this with a solution made by dissolving 7½ ounces of acetate of lime, also dissolved in 69 ounces of water. Stir well, allow it to settle, and filter or decanter

off the clear fluid for use, and use this mixture 2½° Tw.

The fabric is first put into the stannate of soda mordant for a few minutes, then wrung out and put into the alum mordant for about the same time; then it is again wrung out and entered in the dye bath at 120° F. and dyed to shade desired, and afterwards rinsed in cold water and dried.

The dye bath is made of ¼ ounce of rose bengal per gallon of water. If fast pink is the dye used, the mordant used would be Turkey red oil and red liquor. Use 8 ounces of Turkey red oil per gallon of water. Put the fabric into this, then wring out the textile and work in red liquor of 7° Tw. for about 2 hours, then wring out and dye in a separate bath made up of eosine, or fast pink, in water in which a little alum has been dissolved.

To Dye Woolen Yarns, etc., Various Shades of Magenta.—To prepare the dye bath dissolve 1 pound of roseine in 15 gallons of water. For a concentrated solution use only 10 gallons of water, while if a very much concentrated color is needed, dissolve the dye in methylated spirit of wine, and dilute this spirituous tincture with an equal quantity of water.

No mordant is required in using this color in dyeing woolen goods. The dyeing operation consists simply in putting the goods into the dye bath at 190° F. and working them therein until the desired shade is obtained, then rinsing in cold water and drying.

If the water used in preparing the dye is at all alkaline, make use of the acid roseine dissolved in water in which a little sulphuric acid has been mixed, and work, gradually raising to the boiling point, and keep up the temperature for 30 minutes, or according to the shade desired. Put about 20 per cent sulphate of soda into the dye bath.

Maroon Dye for Woolens.—To prepare the dye bath, dissolve about 1 pound of maroon dye in boiling water, with or without the addition of methylated spirit of wine. For dark shades dissolve in boiling water, only slightly acidulated with hydrochloric acid, and filter before use. No mordant is required with this dye when dyeing wool, but for the bright shade a little curd soap may be dissolved in the dye bath before proceeding to dye the wool, while for the dark shade it is best to put in a little acetate of soda. To use the dye, first dye in a weak bath and gradually strengthen it until the desired shade is obtained, at the same time gradually increasing the temperature until just below the boiling point.

To Dye Woolens with Blue de Lyons.—Dissolve 8 ounces of blue dye in 1 gallon of methylated spirit, which has been slightly soured with sulphuric acid, and boil the solution over a water bath until it is perfectly clear. To prepare the dye bath, add more or less of the spirituous tincture to a 10- or 15-gallon dye bath of water, which has been slightly soured with sulphuric acid.

Rich Orange on Woolen.—Dissolve 1 pound of phosphine in 15 gallons of boiling water, and stir the fluid until the acid has dissolved. No mordant is required to dye wool. First work the goods about in a weak solution, and finally in one of full strength, to which a little acetate of soda has been added. Keep up the temperature to just below the boiling point while working the goods in the dye bath.

DYEING SILK OR COTTON FABRICS WITH ANILINE DYES:

Aniline Blue on Cotton.—Prepare a dye bath by dissolving 1 pound of aniline blue (soluble in spirit) in 10 gallons of water, and set it aside to settle. Meanwhile prepare a mordant while boiling 35 ounces of sumac (or 5½ ounces tannic acid in 30 gallons of water) and then dissolve therein 17 ounces of curd soap. Boil up and filter. Put the cotton goods in the hot liquid and let them remain therein for 12 hours. Then wring them out and make up a dye bath of 2½° Tw. with red liquor. Add dye color according to the shade desired. Put in the goods and work them until the color is correct, keeping the temperature at the boiling point.

To Dye Silk a Delicate Greenish Yellow.—Dissolve 2 ounces of citronine in 1 gallon of methylated spirit and keep the solution hot over a water bath until perfectly clear.

To prepare silk fabrics, wash them in a weak soap liquor that has been just sweetened (i. e., its alkalinity turned to a slight sourness) with a little sulphuric acid. Work the goods until dyed to shade, and then rinse them in cold water that has been slightly acidulated with acetic, tartaric, or citric acid.

To Dye Cotton Dark Brown.—Prepare a mordant bath of 10 pounds of catechu, 2 pounds of logwood extract, and ¼ pound magenta (roseine), and bring to a boil; work the goods therein for 3 hours at that temperature; then put

into a fresh dye bath made up of 3 pounds of bichromate of potash and 2 pounds of sal soda, and dye to shade. These proportions are for a dye bath to dye 100 pounds of cotton goods at a time.

To Dye Silk Peacock Blue.—Make up a dye bath by putting 1 pint of sulphuric acid at 170° Tw., and 10 ounces of methylin blue crystal dye liquor of 120° to 160° Tw., with a dye bath that will hold 80 pounds of goods. Put in the silk at 130° F., and raise to 140° F., and work up to shade required.

To Dye Felt Goods.—Owing to this material being composed of animal and vegetable fiber it is not an easy matter always to produce evenness of shade. The best process to insure success is to steep well the felt in an acid bath of from 6° to 12° Bé., and then wash away all traces of acid. Some dyers make the fulling stork the medium of conveying the dye, while others partially dye before fulling, or else dye after that process.

The fulling stock for 72 ounces of beaver consists of a mixture of

Black lead or plumbago	16 ounces
Venetian red	48 ounces
Indigo extract (fluid)	5 ounces

Ordinary Drab.—

Common plumbago	12 ounces
Best plumbago	12 ounces
Archil extract (fluid)	15 ounces
Indigo extract	10 ounces

Mix into fluid paste with water and add sulphuric acid at 30° Tw. For the dye liquor make a boiling-hot solution of the aniline dye and allow it to cool; then put into an earthenware vessel holding water and heat to 83° F., and add sufficient dye liquor to give the quantity of felt the desired shade. First moisten well the felted matter (or the hair, if dyed before felting) with water, and then work it about in the above dye bath at 140° F. To deepen the shade, add more dye liquor, lifting out the material to be dyed before adding the fresh dye liquor, so that it can be well stirred up and thoroughly mixed with the exhausted bath.

Brown Shades.—Bismarck brown will give good results, particularly if the dyed goods are afterwards steeped or passed through a weak solution (pale straw color) of bichromate of potash. This will give a substantial look to the color. Any of the aniline colors suitable for cotton or wool, or those suited for mixed cotton and wool goods may be used.

Blue.—Use either China blue, dense ferry blue, or serge blue, first making the material acid before dyeing.

Green.—Use brilliant green and have the material neutral, i. e., neither acid nor alkali; or else steep in a bath of sumac before dyeing.

Plum Color.—Use maroon (neutral or acid) and work in an acid bath or else sumac.

Black.—Use negrosin in an acid bath, or else mordant in two salts and dye slightly acid.

Soluble Blue, Ball Blue, etc.—A soluble blue has for many years been readily obtainable in commerce which is similar in appearance to Prussian blue, but, unlike the latter, is freely soluble in water. This blue is said to be potassium ferriferrocyanide.

To prepare instead of buying it ready made, gradually add to a boiling solution of potassium ferricyanide (red prussiate of potash) an equivalent quantity of hot solution of ferrous sulphate, boiling for 2 hours and washing the precipitate on a filter until the washings assume a dark-blue color. The moist precipitate can at once be dissolved by the further addition of a sufficient quantity of water. About 64 parts of the iron salt is necessary to convert 100 parts of the potassium salt into the blue compound.

If the blue is to be sent out in the liquid form, it is desirable that the solution should be a perfect one. To attain that end the water employed should be free from mineral substances, and it is best to filter the solution through several thicknesses of fine cotton cloth before bottling; or if made in large quantities this method may be modified by allowing it to stand some days to settle, when the top portion can be siphoned off for use, the bottom only requiring filtration.

The ball blue sold for laundry use consists of ultramarine. Balls or tablets of this substance are formed by mixing it with glucose or glucose and dextrin, and pressing into shape. When glucose alone is used, the product has a tendency to become soft on keeping, which tendency may be counteracted by a proper proportion of dextrin. Bicarbonate of sodium is added as a filler to cheapen the product, the quantity used and the quality of the ultramarine employed being both regulated by the price at which the product is to sell.

New Production of Indigo.—Forty parts of a freshly prepared ammonium sulphide solution containing 10 per cent

of hydrogen sulphide are made to flow quickly and with constant stirring into a heated solution of 20 parts of isatine anilide in 60 parts of alcohol. With spontaneous heating and temporary green and blue coloration, an immediate separation of indigo in small crystalline needles of a faint copper luster takes place. Boil for a short time, whereupon the indigo is filtered off, rewashed with alcohol, and dried.

To Dye Feathers.—A prerequisite to the dyeing of feathers appears to be softening them, which is sometimes accomplished by soaking them in warm water, and sometimes an alkali, such as ammonium or sodium carbonate, is added. This latter method would apparently be preferable on account of the removal of any greasy matter that may be present.

When so prepared the feathers may be dyed by immersion in any dye liquor. An old-time recipe for black is immersion in a bath of ferric nitrate suitably diluted with water, and then in an infusion of equal parts of logwood and quercitron. Doubtless an aniline dye would prove equally efficient and would be less troublesome to use.

After dyeing, feathers are dipped in an emulsion formed by agitating any bland fixed oil with water containing a little potassium carbonate, and are then dried by gently swinging them in warm air. This operation gives the gloss.

Curling where required is effected by slightly warming the feathers before a fire, and then stroking with a blunt metallic edge, as the back of a knife. A certain amount of manual dexterity is necessary to carry the whole process to a successful ending.

DYES FOR FOOD:
See Foods.

DYES FOR LEATHER:
See Leather.

DYE STAINS, THEIR REMOVAL FROM THE SKIN:
See Cleaning Preparations and Methods.

DYNAMITE:
See Explosives.

EARTHENWARE:
See Ceramics.

EAU DE QUININE:
See Hair Preparations.

EBONY:
See Wood.

EBONY LACQUER:
See Lacquers.

ECZEMA DUSTING POWDER FOR CHILDREN.

Starch, French chalk, lycopodium, of each, 40 parts; bismuth subnitrate, 2 parts; salicylic acid, 2 parts; menthol, 1 part. Apply freely to the affected parts.

Eggs

The age of eggs may be approximately judged by taking advantage of the fact that as they grow old their density decreases through evaporation of moisture. According to Siebel, a new-laid egg placed in a vessel of brine made in the proportion of 2 ounces of salt to 1 pint of water, will at once sink to the bottom. An egg 1 day old will sink below the surface, but not to the bottom, while one 3 days old will swim just immersed in the liquid. If more than 3 days old the egg will float on the surface, the amount of shell exposed increasing with age; and if 2 weeks old, only a little of the shell will dip in the liquid.

The New York State Experiment Station studied the changes in the specific gravity of the eggs on keeping and found that on an average fresh eggs had a specific gravity of 1.090; after they were 10 days old, of 1.072; after 20 days, of 1.053; and after 30 days, of 1.035. The test was not continued further. The changes in specific gravity correspond to the changes in water content. When eggs are kept they continually lose water by evaporation through the pores in the shell. After 10 days the average loss was found to be 1.60 per cent of the total water present in the egg when perfectly fresh; after 20 days, 3.16 per cent; and after 30 days, 5 per cent. The average temperature of the room where the eggs were kept was 63.8° F. The evaporation was found to increase somewhat with increased temperature. None of the eggs used in the 30-day test spoiled.

Fresh eggs are preserved in a number of ways which may, for convenience, be grouped under two general classes: (1) Use of low temperature, i. e., cold storage; and (2) excluding the air by coating, covering, or immersing the eggs, some material or solution being used which may or may not be a germicide. The two methods are often combined.